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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,539	07/20/2004	Chun-Ming Cho	REAP0087USA	4538
27765	7590	01/08/2009	EXAMINER	
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			SINGH, HIRDEPAL	
			ART UNIT	PAPER NUMBER
			2611	
			NOTIFICATION DATE	DELIVERY MODE
			01/08/2009	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/710,539	<b>Applicant(s)</b> CHO ET AL.	
	<b>Examiner</b> HIRDEPAL SINGH	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,5,7-12,14,16,18 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,14,16 and 18 is/are rejected.
- 7) ☒ Claim(s) 7-12, 20-26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This action is in response to the amendment filed with request for continued examination on October 27, 2008. Claims 1-2, 5, 7-12, 14, 16, 18 and 20-26 are pending and have been considered below.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1-2, 5, 7-12, 14, 16, 18 and 20-26 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-2, 5, 7-12 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent<sup>1</sup> and recent Federal Circuit decisions<sup>2</sup> indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another

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<sup>1</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

<sup>2</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

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statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example the method for detecting intersymbol interference in claim 1 should be tied to a statutory class as a device, apparatus, system or means for doing so, i.e. as a correlator for computing the correlation and a comparator for comparing the correlations need to be tied to any one the method step(s) of claim 1.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 5, 14, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (US 2005/0152317) in view of Gummadi et al. (US 7,136,436) and further in view of Kakura (US 2003/0090994) further in view of Chen (US 2005/0084025).

**Regarding Claims 1 and 14:**

Awater discloses method and system for detecting inter-symbol interference (ISI) and accordingly improving a timing of a detected boundary used for processing a plurality of different symbols (abstract; paragraph 0054), wherein the plurality of different symbols composed of a plurality of signals which are respectively transmitted

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transmitting via a plurality of sub-carriers in an OFDM system (column 5, lines 12-22; column 6, lines 1-6), the method comprising:

computing a first correlation value (correlator 304 in figure 5 is similar to present invention correlator 90 shown in figure 2; paragraphs 0037, and 0061) with a first correlator according to a specific signal of the current symbol and a specific signal of another symbol;

computing a second correlation value (304 in figure 5, that includes accumulator 312 accumulates samples of previous and also the next symbols in order to generate the correlation value by the correlation block 304; also see paragraphs 0051-0052) according to the specific signal of the current symbol and another signal;

a comparator (320 in figure 5) for comparing the first correlation value with the second correlation value to determine whether the first correlation value is larger than the second correlation value (paragraph 0056); and

a controller that receives input from the boundary detection blocks and control different functions (figure4; paragraph 0034).

Awaterr discloses all of the subject matter as described above except for specifically teaching that (1) the plurality of different symbols comprise a previous symbol, a current symbol and a following symbol; (2) the signals are transmitted via same sub-carriers; (3) adjusting the boundary comprise, delaying the boundary when the first correlation value is larger than the second correlation value due to the timing of the detected boundary being ahead of the timing of an ideal boundary, and advancing the timing of the detected boundary when the second correlation value is larger than the

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first correlation value due to the timing of the detected boundary lagging behind the timing of the ideal boundary.

However, regarding item (1) above Chen in the same field of endeavor, discloses a similar apparatus and method timing offset compensation in OFDM communication where the plurality of different symbols comprise a previous symbol, a current symbol and a following symbol (paragraph 0057, see claim 7 also).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use teachings of Chen for correlating current symbol of Chen in a water correlator with the previous symbol and also with next symbol for boundary detection and adjustment in order to provide a better system for rapidly acquiring and continuously tracking the timing of the signal.

However, Regarding item (2) above Gummadi in the same field of endeavor, discloses a similar apparatus and method for boundary detection using multiple correlations, where the received signal is correlated with previous signal and both are transmitted through same channel (column 5, lines 58-67), also the system could be using a multi-carrier or single-carrier technique (column 9, lines 55-65), the correlation value is generated by comparing samples in a period with samples in another/different period (column 6, lines 22-28), furthermore the correlation value is generated by comparison of samples of a period with samples in another adjacent period (abstract; column 6, lines 56-67), and a control signal to control the functions of the system (figure 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use the same carrier or sub-carrier as taught by Gummadi in Awater system to transmit the signals in order to get same modulation and demodulation for the signals of different symbols, and generate a correlation value by comparing adjacent period samples i.e. a period previous to first one or by comparing a period next to first one in order to see the presence of sequence boundary more rapidly and to make more reliable interference rejection.

However, Regarding item (3) above Kakura in the same field of endeavor, discloses an apparatus and method for guard interval length control in OFDM where plurality of correlation values (paragraphs 0036-0038) are detected based on the symbols transmitted over plurality of sub carriers (figure 2; paragraphs 0012 and 0117; with the sub-carriers are obviously placed adjacent to each other) for transmitting the signals, and detecting a timing for adjusting the timing of the boundary according to the comparison result (figures 6-8; paragraph 0017) by delaying the timing of the boundary when the first correlation value is larger than the second correlation value (paragraphs 0126-0127), or advancing the timing of the boundary when the second correlation value is larger than the first correlation value (figure 7, shorten or elongate timing based on comparison).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit the symbols over plurality of sub-carriers adjacent to each other i.e. second sub-carrier is adjacent to the first sub-carrier and adjust the timing of the boundary as taught by Kakura in the Awater according to the correlation results in

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order to get better performance and to get the synchronization based on the generated correlation value by comparing adjacent period samples to save the acquisition time and power also get the offset estimation correctly with data transmission efficiency.

**Regarding Claims 2 and 16:**

Awater discloses all of the subject matter as described above except for specifically teaching that the specific signals of previous, current and next symbols include pilot signals.

However, Chen in the same field of endeavor discloses a similar apparatus and method timing offset compensation in OFDM communication where specific signals of previous, current and next symbol include pilot signals (abstract; paragraph 0011).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit symbols including plurality of pilot signals in Awater in order to include plurality of pilot signal and plurality of data signals in the symbols in order to get the real data send with the related control or reference information as well.

**Regarding Claims 5 and 18:**

Awater discloses all of the subject matter as described above, but doesn't explicitly disclose that previous, current and next signals are data signals.

However, Chen in the same field of endeavor discloses a similar apparatus and method timing offset compensation in OFDM communication where specific signals of previous, current and next symbol include pilot signals (abstract; paragraph 0013).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit symbols including all data signals as taught by Chen in



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Awater system in order to transmit the required information in the form of data as the all data signals contains more information.

***Allowable Subject Matter***

7. Claims 7-12 and 20-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record discloses a system and method for detecting intersymbol interference in OFDM systems and detecting the timing offset and correcting the boundary of the communication signals by using correlation values of the current signal symbol with previous symbol and with next symbol, but prior art fails to disclose that the first and second correlators for calculating the correlation values comprises a first conjugating circuit for computing a plurality of first conjugated values according to the specific signal of the current symbol, a multiplying circuit for generating a plurality of first product values according to the first conjugated values and the previous symbol and then a first calculation circuit generating plurality of first calculation values with the same sign according to the first product values of multiplication further a first summation circuit for generating the first correlation value according to the first calculation values.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- a. Nakada (US 7,020,116) discloses a system and method for OFDM communication with receiver computing correlation of current symbol with preceding symbol and with next symbol (column 8, lines 5-14).
- b. Schwoerer (US 2007/0053281) discloses a system and method for multicarrier communication where consecutive symbols used for correlation calculation are current and previous symbol and current and following symbol (paragraph 0069)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HIRDEPAL SINGH whose telephone number is (571) 270-1688. The examiner can normally be reached on Mon-Fri (Alternate Friday Off) 8:30 AM-6:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. S./

Examiner, Art Unit 2611

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611